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# Notes on taxonomy and distribution of *Myrsidea serini* (Séguy, 1944) (Phthiraptera: Amblycera: Menoponidae) on Southern South American passerine birds (Aves: Passeriformes)


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## ABSTRACT

Myrsidea serini *(Séguy, 1944) is recorded from three different passerine hosts from Argentina and Chile: Carduelis barbata (Molina, 1782) (Fringillidae),* Chrysomus thilius petersi *(Laubmann, 1934) and Agelaioides badius badius (Vieillot, 1819) (Icteridae). Somatic features and body measurements from available specimens belonging to these host-populations are compared with those recorded from Old World hosts, finding only some slight differences in certain body measurements (here interpreted as correlated to differences in host sizes), but none in chaetotaxy. This species was synoxenic with* Myrsidea psittaci *Carriker, 1955 on* C. t. petersi *in at least two localities in Buenos Aires Province, Argentina. Comparative studies of external chorionic architecture of the eggs, preferential sites of oviposition, prevalence has been carried out for both species, along with some remarks concerning the still problematic species,* Myrsidea argentina *(Kellogg, 1906), originally recorded off* Carduelis magellanica *(Vieillot, 1805).*



Key-Words: *Myrsidea serini; Myrsidea argentina;* Icteridae; Fringillidae; Synoxeny; Egg descriptions; *Carduelis; Chrysomus; Agelaioides.*


## INTRODUCTION

*Myrsidea serini* (Séguy, 1944) was first described from two specimens, male and female, taken from *Serinus serinus* (Linnaeus, 1766) (Fringillidae). Fourty years later, Klockenhoff (1984a) designated the male as lectotype for this species together with a careful redescription and a comparative study of different populations of this species parasitic on representatives of two bird families in the Old World: *S. canaria* (Linnaeus, 1758), *Carduelis carduelis britannica* (Hartert, 1903), *Carduelis carduelis parva* Tschudi, 1901, *Carduelis chloris chloris* (Linnaeus, 1758) (Fringillidae) and *Emberiza citrinella caliginosa* Clancey, 1940 (Emberizidae). In a subsequent paper (Klockenhoff, 1984b) this author erected the "*M. serini*-Artengruppe", a species-complex involving three species: *M. serini, M. queleae* Tendeiro, 1964 and *M. textoris* Klockenhoff, 1984. The latter two species were not mentioned by Price & Dalgleish (2007) for their "*serini*-species group".

As there are no published records of *M. serini* from Southern South American hosts, the purpose of this contribution is mainly four. First, to study mor-


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phologically and re-illustrate both sexes of *M. serini.* Second, to carry out a chaetotaxical and morphometric comparative study of three available populations of this species collected on three host species: *Carduelis barbata* (Molina, 1782) (Fringillidae) from Chile, *Agelaioides badius badius* (Vieillot, 1819) and *Chrysomus thilius petersii* (Laubmann, 1934) (Icteridae) from Argentina. Third, describe the external chorionic architecture of the egg and sites of oviposition of *M. serini* and *M. psittaci* Carriker, 1955 (*sensu lato,* as stated by Clay, 1968), both often synoxenic on individuals of the latter host species. Fourth, to give some remarks concerning the still problematic species *Myrsidea argentina* (Kellogg, 1906) originally recorded off *Carduelis magellanica* (Vieillot, 1805).

## MATERIALS AND METHODS

Some of the adult specimens are received in vials (from M.A. Marín, Chile), and many others were collected by one of us (ACC) from freshly killed birds following procedure described below.

Each bird specimen netted and collected in the field has been immediately enveloped with absorbent paper and put in an individual plastic bag containing *ca.* 5 $cm^3$ of ethyl acetate to kill the lice specimens *in situ,* then labeled and frozen as soon as possible.

In the laboratory, each individual bird was carefully examined feather-by-feather under a dissecting microscope by the senior author. The place where each louse was found was indicated in pre-printed cards, paying special attention to delimitate the oviposition sites. The visual examination, made by a trained person, was employed for gathering these biological data due its level of confidence (Koop & Clayton, 2013).

All feather carrying lice eggs were removed and stored in coded vials, preserving some of them in 3% Glutaraldehyde in a $PO_4HNa_2$ 5% solution for SEM studies. Lice specimens were mounted in slides following regular procedures and using Canada Balsam as mounting medium (Cicchino & Castro, 1978).

Eggs were prepared for SEM studies following Abrahamovich & Cicchino (1985). For light microscope eggs were cleared in a pheno-ethanol 3:1 vol/vol mixture during 6-12 hours, mounted in concave slides using this medium, covered with a thin cover slip to observation and drawn at various magnifications. Identities of eggs were checked by dissections of gravid females of both species found.

Measurements of adult lice are in millimeter and taken from mounted specimens. Body parameters used are those employed by Klockenhoff *et al.* (1979: 207), and identified by the following abbreviations: HL = head length, OW = maximum width of the head (at occipital level), PL = prothorax length, PW = prothorax width, PTL = pterothorax length, PTW = pterothorax width, AL = length of the abdomen, AW = width of the abdomen, and TL = total length of the body.

Repository of specimens: voucher specimens are in personal collection of the senior author (ACC) and in the collection of the Museu de Zoologia da Universidade de São Paulo (MZUSP). The bird names, common and scientific, and family classification follow those in Dickinson (2003).

## RESULTS

### Order Phthiraptera Haeckel, 1896
### Suborder Amblycera Kellogg, 1896
### Family Menoponidae Mjöberg, 1910
### Genus *Myrsidea* Waterston, 1916
### *Myrsidea serini* (Séguy, 1944)
### (Figs. 1-28, 33)

*Menopon serini* Séguy, 1944: 80, Fig. 84.
*Myrsidea serini* (Séguy, 1944): Hopkins & Clay (1952: 233); Negru (1963: 11); Negru (1965: 499, Fig. 1e); Klockenhoff (1984a: 18-22, Figs. 1-4, Tables 1-2); Price *et al.* (2003: 131-132); Price & Dalgleish (2007: 12, Fig. 39).
*Liquidea serini* (Séguy, 1944): Złotorzycka (1964: 169, 176).

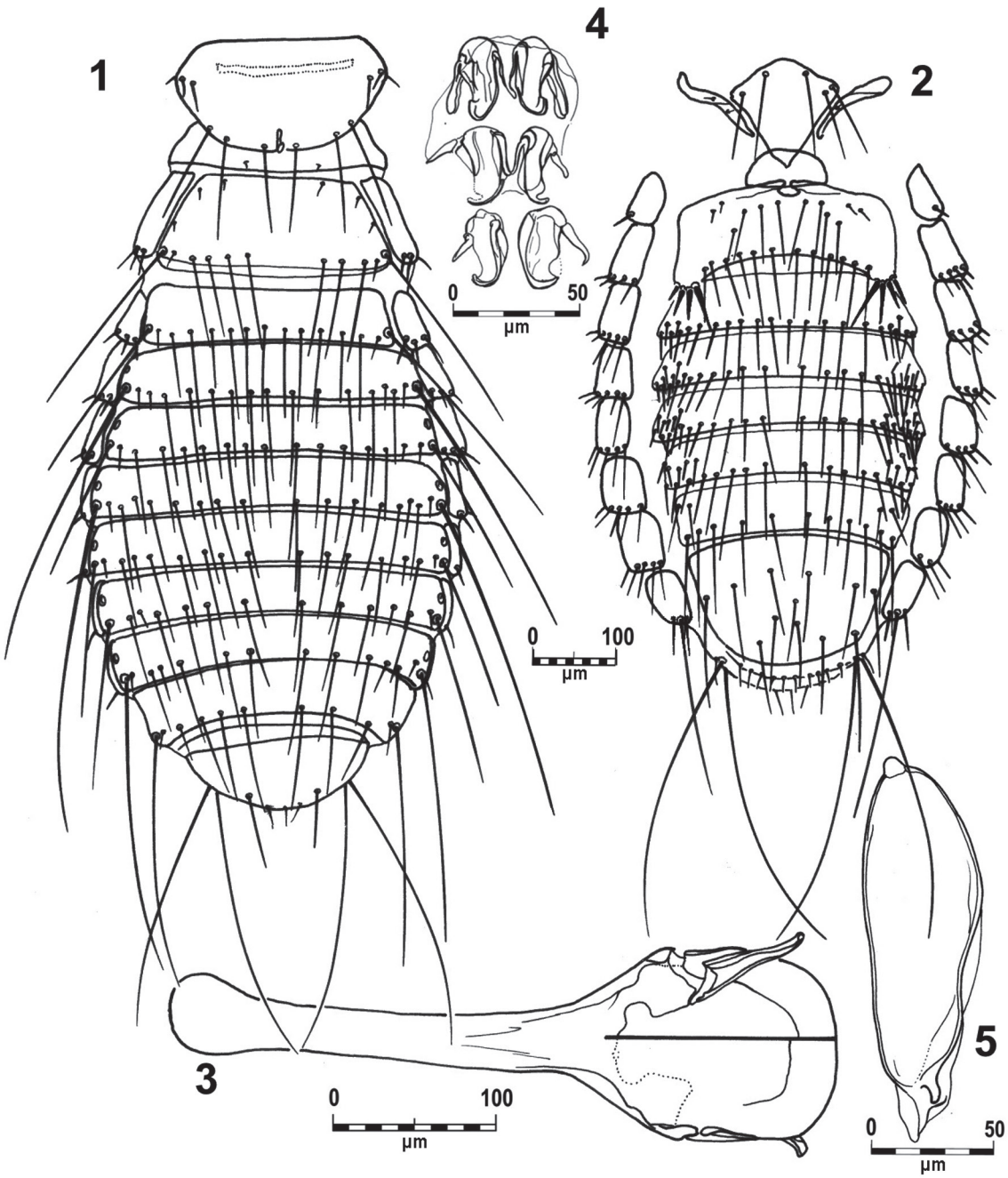
*Material examined:* 1 male and 2 females (ACC), ex *Chrysomus thilius petersii,* Bartolomé Bavio, Magdalena Partido, Buenos Aires Province, Argentina, 30.XII.1984, A.C. Cicchino coll. 1 female (MZUSP #5810), ex *C. t. petersii,* Laguna Bellaca, San Vicente Partido, Buenos Aires Province, Argentina, 5.I.1990, A.C. Cicchino coll. 2 males, 2 females and 3NIII (ACC), 2 males and 1 female (MZUSP #5811-5813), ex *Agelaioides badius badius,* Bartolomé Bavio, Magdalena Partido, Buenos Aires Province, Argentina, 9.VII.1985, A.C. Cicchino coll. 1 male, 4 females and 1NII (ACC), 1 male and 4 females (MZUSP #5814-5817), ex *Carduelis barbata,* Coquimbo, Chile, 5.VIII.1981, M.A. Marín coll.

In both sexes members of the "*M. serini*-Artengruppe" (Klockenhoff, 1984b), or *serini* species-group (Price & Dalgleish, 2007).

General dorsal (Fig. 1 and 6) and ventral (Fig. 2 and 7) habitus of the male and female, respectively. Both sexes, with reduced hypopharynx and metanotum non-enlarged. In females the abdominal

tergites I-III almost unmodified and slightly convex, tergites II-VIII with a noticeably gap separating the marginal posterior setae in a right and a left portion (in the male it is most apparent from tergite III), bursa copulatrix as in Fig. 8, strongly spiculate posterior margin on the subgenital plate (Fig. 9); in males the external genitalia (Fig. 3) and the genital sac sclerites (Fig. 4) distinctives.

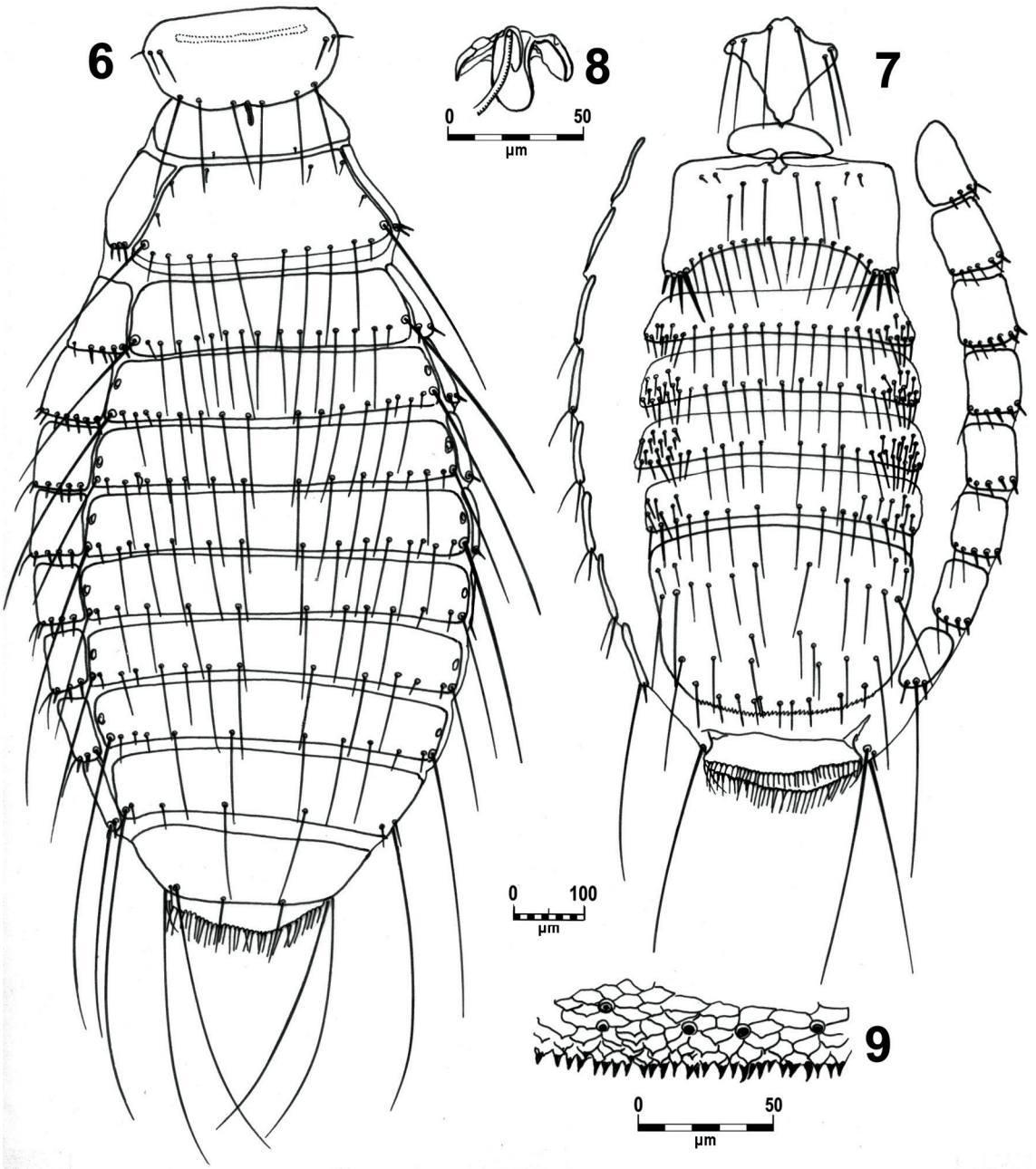
Chaetotaxy of the head – length of dorsal head setae 10 and 11 are diagnostic for separating *M. serini* from the other species inc1uded in *serini* species-group (Klockenhoff, 1984b: 271). Their va1ues match (or fall near) those given by Klockenhoff (1984a: 18), and are given: *dhs10/11 – C. barbata* 0.08-0.09/0.08, ratio 1.0 (male, n = 2) and 0.08/0.07-0.09, ratio 1.0-1.1 (female, n = 8); *A. b. badius* 0.08-0.09/0.08, ratio



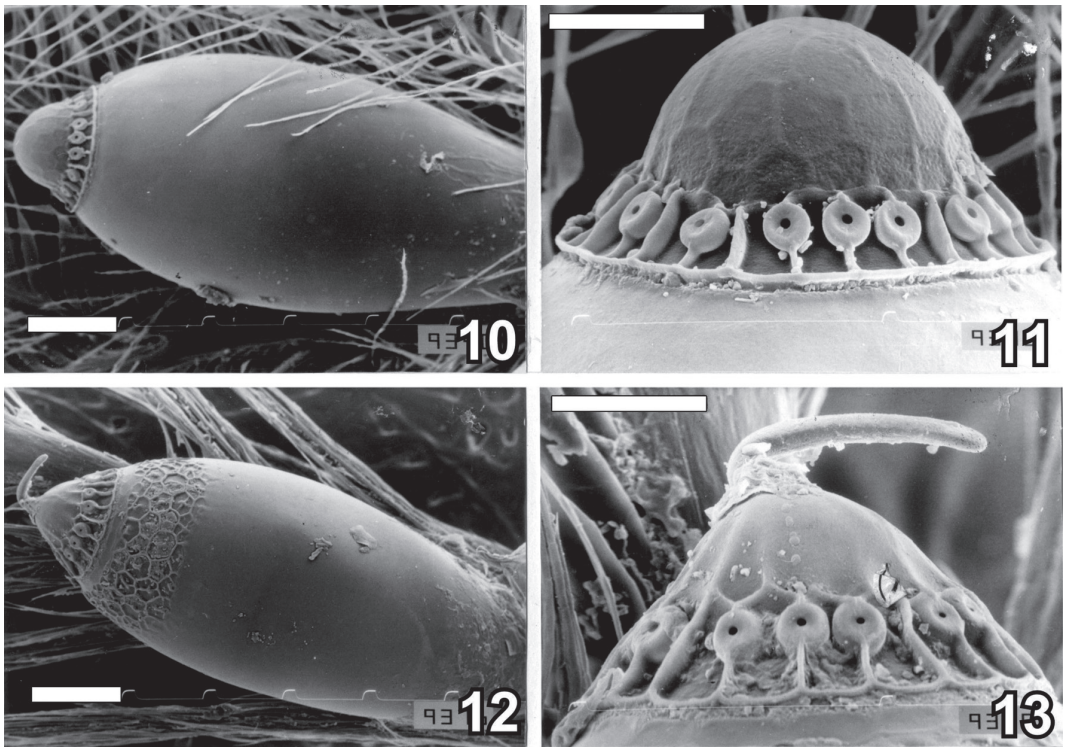

**FIGURES 1-5:** *Myrsidea serini* (Séguy, 1944) male: thorax and abdomen, dorsal view (1); metasternum and abdomen, ventral view (2); external genitalia, dorso-ventral views (3); genital sclerites from three individuals (4); spermatophore (5).

1.0-1.1 (n = 4) and 0.08-0.10/0.08-0.10, ratio 1.1 (n = 3); *C. t. petersii* 0.08/0.09, ratio 0.9 (n = 1) and 0.08-0.10/0.09-0.10, ratio 0.9-1.0 (n = 3); Klockenhoff (1984a) 0.05-0.09/0.06-0.09, ratio 0.9-1.0 (n = 25) and 0.05-0.09/0.07-0.10, ratio 0.7-0.9 (n = 35).

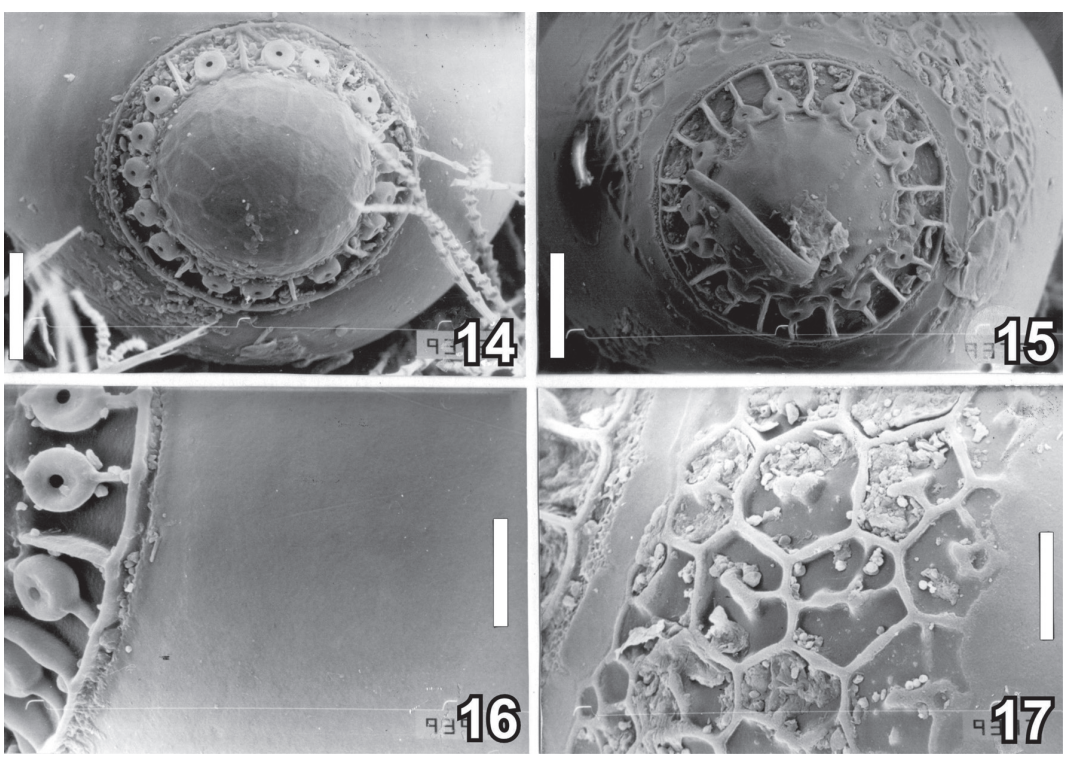
Chaetotaxy of the thorax and abdomen (Table 1) – counting of setae match those given by Klockenhoff *et al.* (1979), Klockenhoff (1980, 1984a: 18-19). Our account neither includes the post-spiraculars nor its accessories, since metanotum to tergite VIII. These data revea1ed a few differences in chaetotaxy among the three populations, but are expected to find in hosts at least partially isolated and/or the small samples available to both studies. Similar results were achieved by Klockenhoff *et al.* (1979) for *M. obovata* (Piaget, 1880) and Klockenhoff (1980) for *M. cornicis* (DeGeer, 1778).




**FIGURES 6-9:** *Myrsidea serini* (Séguy, 1944) female: thorax and abdomen, dorsal view (6); metasternum and abdomen, ventral view (7); bursa copulatrix (8); vulvar margin in detail, setae omitted (9).




**FIGURES 10-13:** Eggs: *Myrsidea serini* (Séguy, 1944) in lateral view (10) and operculum in detail (11); *Myrsidea psittaci* Carriker, 1955 in lateral view (12); operculum in detail (13). ac = air chambers, ap = apical phanerum. Bars = 100 μm.




**FIGURES 14-17:** Eggs: *Myrsidea serini* (Séguy, 1944) operculum in polar view (14) and surface of the proximal third of amphora in detail (16); *Myrsidea psittaci* Carriker, 1955 operculum in polar view (15) and surface of the proximal third of amphora in detail (17). ap = apical phanerum. Bars = 100 μm.

**TABLE 1:** Body chaetoraxy of *Myrsidea serini* (Séguy, 1944) taken from three host populations. Ter = tergites, Ste = sternites, Ple = pleurites.

| | | *Carduelis barbata* | | | | | | *Agelaioides badius badius* | | | | | | *Chrysomus thilius petersii* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Male (n = 2) | | | Female (n = 8) | | | Male (n = 4) | | | Female (n = 3) | | | Male (n = 1) | | | Female (n = 3) | | |
| | | Ter | Ste | Ple | Ter | Ste | Ple | Ter | Ste | Ple | Ter | Ste | Ple | Ter | Ste | Ple | Ter | Ste | Ple |
| Thorax | Gula | 5+5 | | | 5+5 | | | 5+5 | | | 5+5 | | | 5+5 | | | 5+5 | | |
| | Prothorax | 3+3 | | | 3+3 | | | 3+3 | | | 3+3 | | | 3+3 | | | 3+3 | | |
| | Metathorax | 8 | | | 6–8 | | | 10–12 | | | 9–11 | | | 10 | | | 10 | | |
| | Metapleurites | 3+3 | | | 2–4+2–3 | | | 3+3 | | | 3+3 | | | 3+3 | | | 3+3–4 | | |
| | Metasternum | 3+3 | | | 3+3 | | | 3+3 | | | 3–4+3 | | | 2+3 | | | 3+3 | | |
| | Femur III | 14–15+13–15 | | | 13–15+13–15 | | | 15–16+16–17 | | | 17–18+17–19 | | | 15–16 | | | 17–18 | | |
| Abdomen | I | 11 | 0 | 3–4 | 9–10 | 0 | 2–6 | 10–11 | 0 | 4–5 | 11–12 | 0 | 4–6 | 15 | 0 | 3–4 | 17 | 0 | 5 |
| | II | 10–12 | 23–27 | 6–7 | 9–12 | 26–31 | 5–7 | 13–17 | 19–22 | 6–8 | 12–14 | 32–35 | 6–7 | 16 | 31 | 6 | 18 | 32 | 7–8 |
| | III | 10–12 | 18 | 5–6 | 9–13 | 16–21 | 5–7 | 13–14 | 30–34 | 6–7 | 12–14 | 24 | 6–7 | 18 | 23 | 6–7 | 17 | 30 | 6–7 |
| | IV | 10–12 | 26–27 | 5–6 | 9–12 | 27–31 | 5–7 | 12–16 | 29–32 | 5–7 | 10–13 | 34–37 | 5–6 | 17 | 31 | 5 | 17 | 39 | 6 |
| | V | 10 | 29–30 | 5 | 7–9 | 27–35 | 4–6 | 11–12 | 33 | 4–5 | 10–13 | 34–39 | 5–7 | 17 | 32 | 5 | 14 | 42 | 5–6 |
| | VI | 9–10 | 24–25 | 4 | 6–9 | 20–23 | 4–5 | 12–13 | 25–27 | 3–5 | 6–8 | 26–28 | 5 | 15 | 27 | 4–5 | 14 | 28 | 5 |
| | VII | 6–8 | 12–16 | 4 | 4–6 | 12–13 | 4–5 | 9–11 | 15–17 | 4–5 | 5–6 | 12–14 | 4–5 | 14 | 15 | 3–6 | 11 | 15 | 4–5 |
| | VIII | 5–6 | 12–13 | 3 | 3–4 | 7–8 | 3 | 5–6 | 10–12 | 3 | 4 | 8–9 | 3 | 11 | 13 | 3 | 8 | 19 | 3 |
| | Vulva | — | — | — | — | 8–9 | — | — | — | — | — | 8–11 | — | — | — | — | — | 8 | — |

*Measurements:* differences found among the three populations here examined were slight and considered non-significant for taxonomic purposes, including when compared with published data (Klockenhoff, 1984a).

**Males**

*C. barbata* (n = 2) = HL 0.26, OW 0.35, PL 0.13-14, PW 0.26, PTL 0.18-0.20, PTW 0.36-0.37, AL 0.66-0.69, AW 0.44-0.48, TL 1.21-1.28.

*A. b. badius* (n = 4) = HL 0.28-0.29, OW 0.42, PL 0.16, PW 0.27-0.29, PTL 0.21-0.22, PTW 0.38-0.41, AL 0.75-0.77, AW 0.53-0.54, TL 1.39-1.41.

*C. t. petersii* (n = 1) = HL 0.29, OW 0.39, PL 0.16, PW 0.28, PTL 0.17, PTW 0.37, AL 0.70, AW 0.51, TL 1.30.

Klockenhoff (1984a) (n = 25) = HL 0.27-0.30, OW 0.34-0.39, PL 0.12-0.15, PW 0.23-0.26, PTL 0.18-0.22, PTW 0.32-0.37, AL 0.60-0.71, AW 0.42-0.52, TL 1.11-1.30.

**Females**

*C. barbata* (n = 8) = HL 0.27-0.29, OW 0.38-0.40, PL 0.14-19, PW 0.27-0.28, PTL 0.21-0.23, PTW 0.39-0.43, AL 0.80-0.91, AW 0.55-0.62, TL 1.42-1.56.

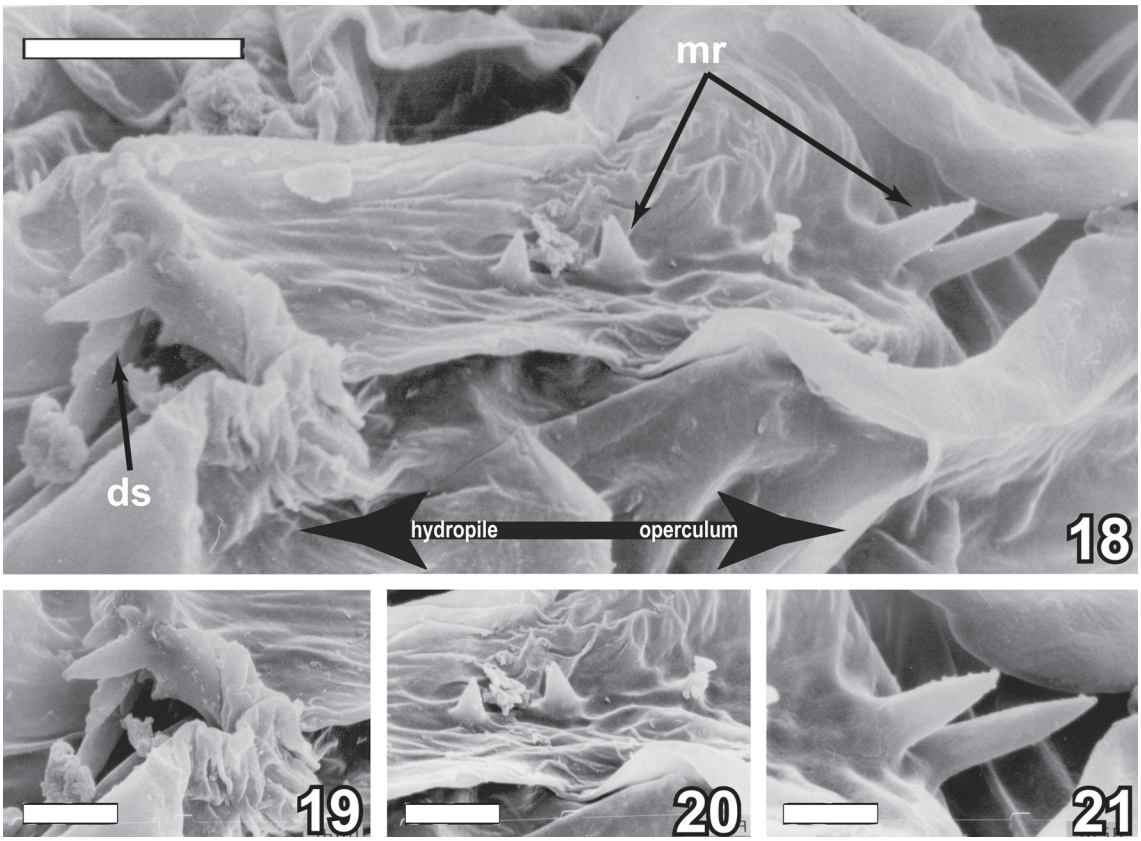
*A. b. badius* (n = 3) = HL 0.29-0.30, OW 0.45-0.46, PL 0.17-0.20, PW 0.30, PTL 0.23, PTW 0.47-0.48, AL 0.94-1.01, AW 0.65-0.71, TL 1.63-1.71.

*C. t. petersii* (n = 3) = HL 0.31-0.32, OW 0.46, PL 0.18, PW 0.18-0.20, PTL 0.24-0.25, PTW 0.46-0.51, AL 0.98-1.05, AW 0.67-0.70, TL 1.70-1.80.

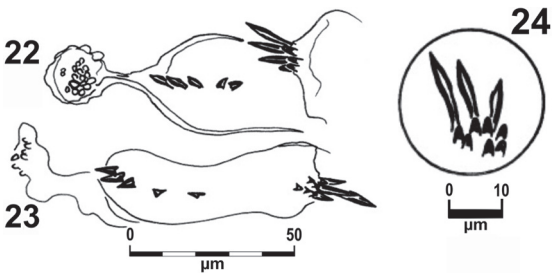
Klockenhoff (1984a) (n = 35) = HL 0.27-0.31, OW 0.36-0.43, PL 0.14-0.19, PW 0.22-0.29, PTL 0.21-0.28, PTW 0.40-0.47, AL 0.80-0.82, AW 0.57-0.70, TL 1.41-1.65.

*Spermatophore:* moderately fusiform (Fig. 5), with a short neck or tube which co-adapts with the medial notch of paired male sclerite (Fig. 4).

*Bursa copulatrix:* small -less than 50 µm wide- and feeb1y sclerotized (Fig. 8). It shows two lateral swellings that ho1d the blunt apica1 ends of the paired male genital sclerite, and the medial portion is designed to hold the neck of spermatophore (Clay, 1968).




**FIGURES 18-21:** Hatching organ of *Myrsidea serini* (Séguy, 1944): general view of the distal set and medial row with lancets (18); distal set in detail (ds, 19); and medial row in detail (mr, 20-21). * points the areas of vitelline membrane. Bars = 100 µm (18) and 25 µm (19-21).




**FIGURES 22-24:** Hatching organ of *Myrsidea serini* (Séguy, 1944): from two different embryos (22-23); apical set of Fig. 22, in other position (24). For further explanations, see text.

## Morphology of the egg

General morphology of egg structures are those employed by Abrahamovich & Cicchino (1985). Differences between egg features of *M. serini* are given in Table 2 together of those of *M. psittaci,* because they can occur synoxenically in the same host individual. As these two species are easily identified by the external morphology of their eggs (Table 2), the presence of unhatched eggs in studies with museum skins might be used to determine differential prevalence in different geographic areas, and also to detect degrees abundance linked to host's breeding season or plumage molts (Foster, 1969a, b).

## Hatching organ

It is a special differentiation of the embryonary membrane to tear the serosa and vitelline membranes during the hatching of first nymph (Figs. 19-24), usually set in a different way in distinct taxa (Blagoveshtchensky, 1955, 1959; Eichler, 1963). This organ of *M. serini* is essentially similar in shape and structure to that of *Menacanthus bonariensis* Cicchino, 2003 (another Menoponidae, see Cicchino, 2003): a tongue-like shaped and tiny pigmented plate composed of three portions (Figs. 19 and 22): a distal set of prominent of lancets of different lengths (Fig. 24), 7-10 in number and clustered together (Figs. 18-19, 22-23); a medial row of 5 shorter lancets (Figs. 18, 20-21); and a basal cluster of up to 18 tubercles or tuberiform thickenings of the membrane (Figs. 22-23). The hatching organ of *M. serini* differs from that of *Menacanthus bonariensis* by less number of medial lancets in *M. serini* (vs 7-8 in *M. bonariensis*), and

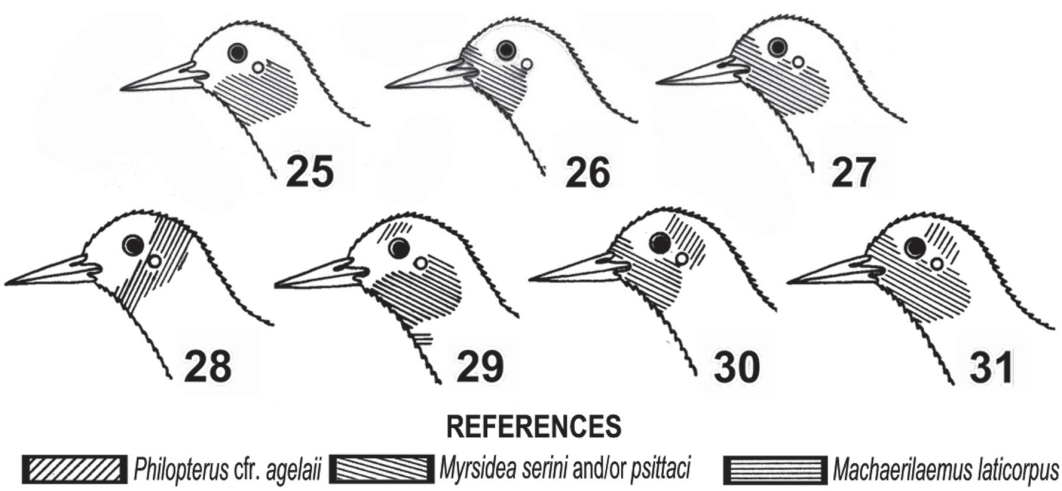
**TABLE 2:** External differences of the eggs of *Myrsidea serini* (Séguy, 1944) and *Myrsidea psittaci* Carriker, 1955, both ex *Chrysomus thilius petersii* (Laubmann, 1934) from Laguna Bellaca, San Vicente, Buenos Aires Province, Argentina. Measurements are given for ten eggs chosen at random. R = range of all the sample; $\bar{X}$ = mean.

| | | *Myrsidea serini* | *Myrsidea psittaci* |
|---|---|---|---|
| **Operculum** | **shape, lateral view** | hemisphaerical (Fig. 11) | conical (Fig. 13) |
| | **apical phanerum** | absent (Figs. 10–11, 14) | present, medium long, typically bent laterad (Figs. 12–13, 15) |
| | **callus** | moderately proeminent, somewhat reflected upward (Figs. 11, 16) | not proeminent, neither reflected upward (Figs. 13, 17) |
| | **degree of impression of the mesh** | light, but conspicuous (Figs. 11, 14) | light, but almost erased (Figs. 13, 15) |
| **Amphora** | **shape, lateral view** | ellipsoidal, ventricose (Fig. 10) | fusiform (Fig. 12) |
| | **sculture** | absent, being the entire surface smooth (Figs. 10, 14, 16) | present, restricted to the apical third, strongly impressed. It consists of 2–4 rows of large hexagons, each one containing an irregular medial amoebid crest (Figs. 12, 15, 17) |
| **Whole egg** | **measurements (in mm), total length (apical phanerum excluded) × total width** | 1) 0.638 × 0.293<br>2) 0.634 × 0.342<br>3) 0.659 × 0.317<br>4) 0.683 × 0.317<br>5) 0.659 × 0.317<br>6) 0.708 × 0.317<br>7) 0.708 × 0.317<br>8) 0.708 × 0.305<br>9) 0.732 × 0.342<br>10) 0.708 × 0.317<br>R = 0.634–0.732 × 0.293–0.342<br>$\bar{X}$ = 0.688 × 0.318 | 1) 0.708 × 0.293<br>2) 0.634 × 0.293<br>3) 0.659 × 0.293<br>4) 0.659 × 0.293<br>5) 0.659 × 0.293<br>6) 0.683 × 0.268<br>7) 0.683 × 0.293<br>8) 0.683 × 0.293<br>9) 0.659 × 0.293<br>10) 0.634 × 0.293<br>R = 0.634–0.708 × 0.268–0.293<br>$\bar{X}$ = 0.664 × 0.289 |

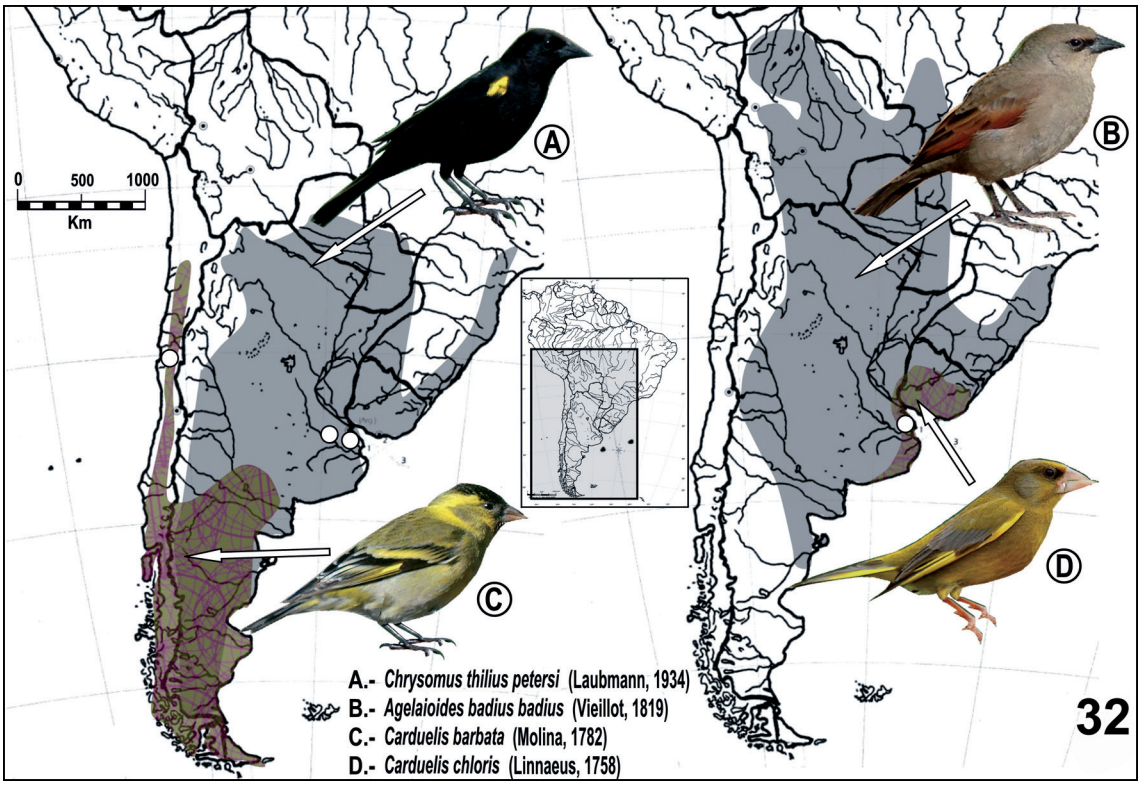
caudal tooth with one central spine in basal cluster in *M. bonariensis* (absent in *M. serini*).

### Sites of oviposition

Eggs were found glued by means of a moderate amount of hygroscopic spumaline (Hinton, 1977) to the underside of the rachis (less frequently to the overside) of feathers of the front, chin, face, auricular region and upper portion of the neck (Figs. 25-27). Usually there is one egg per feather, but two or often more are found in heavy infestations. *Myrsidea psittaci* apparently prefers the feathers of the front, loreal area, face, periauriculars and adjacent areas of the upper neck. When both species are in synoxenism, apparently there is 1ittle




**FIGURES 25-31:** Oviposition sities of *Myrsidea serini* (Séguy, 1944) in seven different individuals of *Chrysomus thilius petersii* at Laguna Bellaca, San Vicente District, Buenos Aires Province, when alone, or synoxenic with *M. psittaci, Philopterus* cf *agelaii* and *Machaerilaemus laticorpus.* For further explanations, see text.




**FIGURES 32:** Host geographic distribution and collections sites (white circles): *Chrysomus thilius petersii; Agelaioides badius badius; Carduelis barbata; Carduelis chloris.*

or no competition for oviposition sites: in either light or heavy infestations each species tends to oviposite on the feathers in the regions cited above, and although some degree of over1ap do exists it was no observed eggs of both species in the same feather (Figs. 26-27).

## Spatial relationships of *Myrsidea serini* with other louse species found on South American passerines

Since no adequate studies have been made on possible competition for sites of oviposition among different genera of lice occurring in the same individual host, some observations taken in January 1990 from a flock of 10 individuals of *C. t. petersi* in Laguna Bellaca (San Vicente Partido, Buenos Aires Province, Argentina) may be of interest. They suggest some degree of exclusion among *M. serini, M. psittaci, Machaerilaemus laticorpus* (Carriker, 1903) (Amblycera, Menoponidae) and *Philopterus* cf *agelaii* (Osborn, 1896) (Ischnocera, Philopteridae). After a general picture showing how these species share the host body, notes on the synoxenic distribution and prevalence of this widely spread *Myrsidea* species is presented below.

In individuals heavily infested by *P.* cf *agelaii* (8 males, 12 females, 12 nymphs) (Fig. 28), sites of oviposition of *M. serini* extends from the nuchal area to the chin and upper neck. In synoxenism of heavily infested individuals by *M. serini* (8 males, 14 females, 14 nymphs, and more than 35 operculated eggs) and lightly infestations of both *P.* cf *agelaii* and *M. laticorpus* (Fig. 29), *M. serini* lays its eggs in the auricular and upper neck area, whilst *P.* cf *agelaii* does in the upper head, and *M. laticorpus* in the middle neck, without overlapping. When *M. serini* and *M. psittaci* occurs synoxenically in moderate infestations (up to 6 individuals) together with *P.* cf *agelaii* (Fig. 30), eggs of the two *Myrsidea* species are laid on the lores, face, chin, upper neck and the external peri-auriculars, occupying *P.* cf *agelaii* the remaining peri-auriculars until the nuchal area. In individuals heavily infested with *M. serini, M. psittaci* and *P.* cf *agelaii* (more than 10 individuals), the sites of oviposition of the two *Myrsidea* species extend to the middle neck, not overlapping those of the *Philopterus* species (Fig. 31).

### Synoxenic distribution

It has been possible to study this phenomenon in flocks of *C. t. petersi* of two localities of NE Buenos Aires Province: Laguna Bellaca (data given above)

**TABLE 3:** Host and locality records for *Myrsidea serini* (Séguy, 1944).

| Bird family | Host species or subespecies | Locality data | Synoxenic with | Source of Information |
|---|---|---|---|---|
| Fingillidae (Carduelinae) | *Serinus serinus* (Linnaeus, 1766) (type host) | France (?) | — | Séguy (1944) |
| | | Prahova Valley, ROMANIA | — | Negru (1963, 1965) |
| | | MOROCCO | — | Klockenhoff (1984a) |
| | *Serinus canaria* (Linnaeus, 1758) | London, ENGLAND | — | Klockenhoff (1984a) |
| | | Christchurch, NEW ZEALAND | — | Klockenhoff (1984a) |
| | *Carduelis carduelis britannica* (Hartert, 1903) | Upper Hutt, NEW ZEALAND | — | Klockenhoff (1984a) |
| | *Carduelis carduelis parva* Tschusi, 1901 | SPAIN | — | Klockenhoff (1984a) |
| | *Carduelis chloris chloris* (Linnaeus, 1758) | Upper Hutt, NEW ZEALAND | — | Klockenhoff (1984a) |
| | | Lyttelton, NEW ZEALAND | — | Klockenhoff (1984a) |
| | *Carduelis barbata* (Molina, 1782) | Coquimbo, CHILE | — | **Present study** |
| Emberizidae (Emberizinae) | *Emberiza citrinella caliginosa* Clancey, 1940 | Raoul and Kermadec Islands, NEW ZEALAND | — | Klockenhoff (1984a); Price & Dalgleish (2007) |
| Icteridae | *Chrysomus thilius petersii* (Laubmann, 1934) | Lag. Bellaca, S. Vicente, Bs. Aires, ARGENTINA | *M. psittaci* s.l. | **Present study** |
| | | Gral. Mansilla, Magdalena, Bs. Aires, ARGENTINA | *M. psittaci* s.l. | **Present study** |
| | *Agelaioides badius badius* (Vieillot, 1819) | Gral. Mansilla, Magdalena, Bs. Aires, ARGENTINA | — | **Present study** |

(n = 10) and General Mansilla, Magdalena District (n = 12) (Fig. 32). In both flocks synoxenia of *M. serini-M. psittaci* was of frequent occurence, reaching *ca.* 50% of the individuals parasitized (n = 8). It must be noted that in one or both species of a synoxenic pair may have polyxenic distribution (*sensu* Nelson, 1972: 5), that is, parasitizes different species of hosts. According with this, *M. serini* should be the most polyxenic species of the pair *M. serini-M. psittaci,* parasitizing not closely related hosts belonging to three different passerine families, as shown in Table 3. *Myrsidea psittaci* is also a polyxenic species but with a more restricted range, parasitizing several genera of Icteridae (*Chrysomus* Swainson, 1837, *Agelaioides* Cassin, 1866, *Gnorimopsar* Richmond, 1908, *Amblyramphus* Leach, 1814, *Pseudoleistes* Sclataer, 1862 and *Scaphidura* Gmelin, 1788) in South America, and, in turn, it may also be synoxenic with *Myrsidea* species other than *M. serini* (Valim & Cicchino, in prep.).

Although the host distribution of each synoxenic species usually does not follow any definite geographical pattern within the ranges of their respective hosts (Fig. 32), *M. serini* seems a primary parasite (*sensu* Rheinwald, 1968) of an Old World Cardueline finchs (Fringillidae), spreading secondarily on other passerines, as Emberizidae and Icteridae in New Zealand and New World, respectively. Whereas *M. psittaci* seems a primary parasite of certain Icteridae such as *Agelaioides, Pseudoleistes* and *Scaphidura,* and secondarily has invaded other genera of this same family as *Amblyramphus, Gnorimopsar* and *Agelaius.*

Klockenhoff (1984a) found *M. serini* in three passerine species (Table 3) introduced in New Zealand from Europe, being *Carduelis chloris* one of them. As this finch has been introduced successfully in Uruguay and adjacent part of Argentina (Montaldo, 1979; Olrog, 1979, 1984), *M. serini* is also expected to be found on this host, but not reported to date. Price & Dalgleish (2007) stated that it is an atypical species, considering the host distribution patterns presented in *Myrsidea* genus, due its occurence on, at least, two different host families (Price *et al.,* 2003). Such unusual host and geographical distribution of *M. serini* could be explained by the straggling and subsequent establishment of this species on other hosts from canaries in Argentina, Chile and in New Zealand as well.

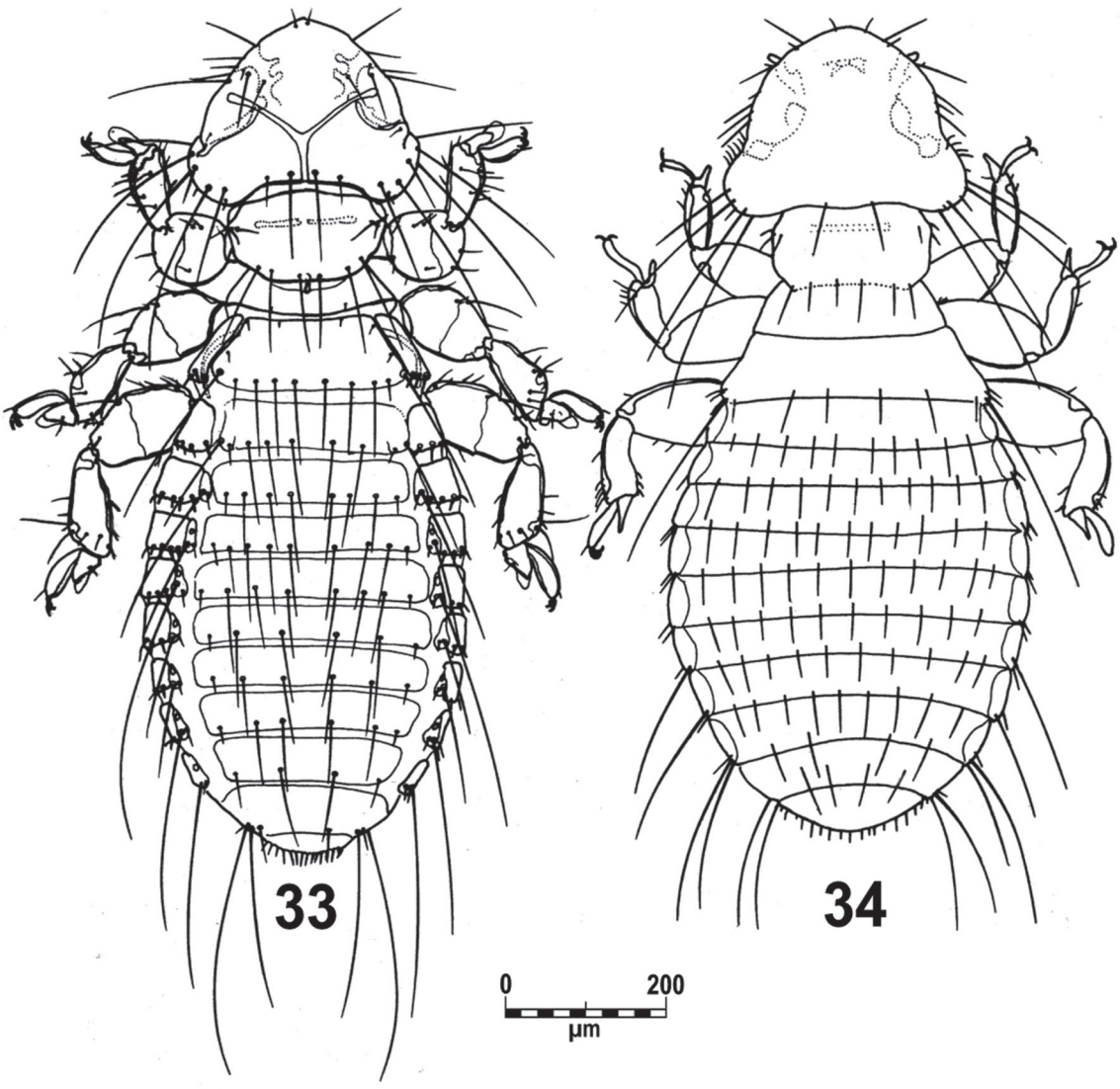
## Prevalence

Locally at Laguna Bellaca, in a population of *C. thilius petersi,* 3 of 5 individuals (60%) were parasitized with *M. serini,* being in two also synoxenic with *M. psittaci.* As these two species are easily identified by the external morphology of their eggs (see above), the presence of unhatched eggs in museum study skins can be used to determine differential prevalences in

different geographic areas, and also to detect degrees abundance linked to host's breeding season or plumage molts (Foster, 1969a, b). At a larger scale encompassing the northeastern quadrant of Buenos Aires Province, in this same host (n = 15), 4 were parasitized with *P.* cf *agelaii* only, 1 with *Myrsidea psittaci,* 6 with the former species together with *Myrsides psittaci* (in 2 this species synoxenic with *M. serini*), and 1 with the three cited species plus *Machaerilaemus laticorpus,* in addition to 3 other individuals with no lice. At the same scale level, and regarding *Agelaioides badius badius* (n = 36), 9 individuals were parasitized by *Philopterus* sp. nov. only, 1 with *Myrsidea serini* only, 4 with the latter two species together, 8 with *Philopterus* sp. nov. and *Brueelia badia* Cicchino & Castro, 1986, 6 with these latter species plus *Machaerilaemus laticorpus,* 1 with all the four lice species together, in addition to 5 other individuals which bear no lice.

### *Myrsidea serini* vs. *Myrsidea argentina* (Kellogg, 1906)

*Myrsidea argentina* was described from a single specimen, supposedly a female, taken from *Chrysomitris icterica* (= *Carduelis magellanica*) from Argentina, collected by Dr. Carlos Berg in 1902 (Kellogg, 1906). Clay (1968: 238) believed that Kellogg's specimen was a nymph, not a female. After a careful examination of Kellogg's figure and certain details in his de-




**FIGURES 33-34:** Third nymphal instar of *Myrsidea serini* (Séguy, 1944) (ex *Agelaioides badius badius*) (33) and of "female" of *Myrsidea argentina* (Kellogg, 1906) (ex *Carduelis magellanicus*) (after Kellogg, 1906: 34).

**TABLE 4:** Measurements and chaetotaxy of third nymphal instar of *Myrsidea serini* (Séguy, 1944) (ex *Agelaioides badius badius*) and of "female" of *Myrsidea argentina* (Kellogg, 1906) (ex *Carduelis magellanicus*) (after Kellogg, 1906).

| | | ***M. serini,* nymph III (n = 3)** | ***M. argentina,* "female" (n = 1)** |
|---|---|---|---|
| Measurements | HL | 0.279–0.298 | 0.270 |
| | OW | 0.386–0.398 | 0.350 |
| | TL | 1.393–1.405 | 1.200 |
| Marginal setae of pronotum | | 6 | 6 |
| Marginal setae of metanotum | | 6 | 4 |
| Tergocentral setae of abdomen | I | 8–9 | 10 |
| | II | I8 | 11 |
| | III | 8–9 | 11 |
| | IV | 8–9 | 11 |
| | V | 6–7 | 10 |
| | VI | 6–7 | 10 |
| | VII | 6 | 9 |
| | VIII | 4 | 4 |
| Nº of setae of dorsal anal fringe | | 15 | *ca.* 15 |

scription, we agree with Clay's contention, and most probably it is a third nymphal instar. In absence of specimens from *C. magellanica,* that *M. argentina* be or be not the same as *M. serini* is open to question, because some morphological features are difficult to reconcile even with those of the third nymphal instar of *M. serini,* as shown in Table 4. Nevertheless, these differences deserve the following comments:

— *Dimensions:* slight differences in OW and TL probably must be correlated with dimensions of their hosts. In fact, specimens from Icteridae tend to be noticeably larger than those from Fringillidae, so the three nymph III examined from *Agelaioides b. badius* are expected to exhibit larger dimensions than those from *C. magellanica.*

— *Marginal setae of the metanotum:* Kellogg pointed out that "the straight posterior margin with four marginal hairs". The specimens ex *A. b. badius* have unmistakably 6 marginal central setae. Perhaps some of the setae in Kellogg's specimen be missing because no such a gap as illustrated by him (Fig. 34 and Kellogg, 1906: fig. 7) separate the marginal setae from the long angular and short adjacent setae each side of the metanotum.

— *Number of tergocentral setae in abdomen:* some significant differences do exist in segments V-VIII. It is probable that the number of setae illustrated by Kellogg is result of partial superposition of dorsal and ventral views. This contention is based in the lacking of the noticeable gap that divides the tergo-central in a right and left portion (cf Figs. 33-34).

— *Number of setae of the dorsal anal fringe:* Kellogg's figure illustrates *ca.* 15 setae, in agreement with our specimens from *Agelaioides.* This feature, in absence of other definitive details, led us to agree with Clay (1968) in that this specimens is not a female but a nymph, and most probably a third instar nymph, taking in mind that the adult female of *M. serini* has more than 30 hairs in the dorsal anal fringe.

## RESUMO

Myrsidea serini *(Séguy, 1944) é registrada de três passarinhos distintos como hospedeiros na Argentina e Chile: Carduelis barbata (Molina, 1782) (Fringillidae),* Chrysomus thilius petersi *(Laubmann, 1934) e Agelaioides badius badius (Vieillot, 1819) (Icteridae). Características somáticas e medidas corporais de exemplares disponíveis dessas populações de hospedeiros são comparados com os registrados a partir de hospedeiros do Velho Mundo, com apenas pequenas diferenças em algumas medidas no corpo (aqui interpretadas como relacionado a diferença entre o tamanho dos hospedeiros), mas similares com relação a sua quetotaxia. Esta espécie foi encontrada em sinoxenia com* Myrsidea psittaci *Carriker, 1955 parasitando* C. t. petersi *em pelo menos duas localidades na Província de Buenos Aires, Argentina. Estudos comparativos da superfície coriônica dos ovos, sítios preferenciais de oviposição, e prevalência foram realizados para ambas as espécies, além de algumas observações sobre uma espécie ainda problemática,* Myrsidea argentina *(Kellogg, 1906), originalmente registrada em* Carduelis magellanica *(Vieillot, 1805).*

Palavras-Chave: *Myrsidea serini; Myrsidea argentina;* Icteridae; Fringillidae; Sinoxenia; Descrição de ovos; *Carduelis; Chrysomus; Agelaioides.*

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## REFERENCES

Abrahamovich, A.H. & Cicchino, A.C. 1985. Estudios bioecológicos, sistemáticos y filogenéticos de los malófagos parásitos de *Guira guira* Gmelin (Aves, Cuculidae): *Vernoniella bergi* (Kellogg, 1906) (Philopteridae) y *Osborniella guiraensis* (Kellog, 1906) (Menoponidae). I. Identificación de los huevos. *Historia Natural,* 5(25): 209-216.

Blagoveshtchensky, D.I. 1955. К морфологии яйцйа Пухоедов (Mallophaga). [Notes on eggs of Mallophaga]. *Trudy Zoologischenskiy Institut Akademia Nauk USSR,* 21: 262-270. [in russian]

Blagoveshtchensky, D.I. 1959. Пухоеды (Mallophaga). [Nasekomye puchoedy (Mallophaga)] *Fauna SSSR* 1 (1), *Zoologischenkiy Institut Akademia Nauk SSSR, Nova Serie,* (72):1-202. [in russian]

Cicchino, A.C. 2003. *Menacanthus bonariensis* new species (Phthiraptera: Menoponidae), parasitic on the White-bellied Sparrow, *Zonotrichia capensis hypoleuca* (Todd, 1915) (Aves: Passeriformes: Fringillidae) in Buenos Aires Province, Argentina. *Zootaxa,* 358: 1-11.

Cicchino, A.C. & Castro, D.C. 1978. Contribución al conocimiento de los Malófagos Argentinos III. Sobre algunos Menoponidae de la avifauna bonaerense: *Menacanthus eurysternus* (Burmeister) y *M. pici* (Denny) (Insecta Mallophaga). *Revista de la Sociedad Entomológica Argentina,* 37(1-4): 77-83.

Clay, T. 1968. Contributions towards a revision of *Myrsidea* Waterston. III. (Menoponidae: Mallophaga). *Bulletin of the British Museum (Natural History), Entomology,* 21(4): 203-243.

Dickinson, E.C. (Ed.) 2003. *The Howard & Moore complete checklist of the birds of the world.* 3.ed. London, Christopher Helm. 1040p.

Eichler, W. 1963. Arthropoda. Insecta. Phthiraptera I. Mallophaga. *In:* Bronns, H.G. (Ed.). *Klassen und Ordnungen des Tierreichs.* III. Insecta. 7b Phthiraptera. Leipzig, Verlagegesellschaft Geost & Portig K.G. p. 1-291.

Foster, M.S. 1969a. The eggs of three species of Mallophaga and their significance in ecological studies. *Journal of Parasitology,* 55(2): 453-456.

Foster, M.S. 1969b. Synchronized life cycles in the orange-crowned warbler and its mallophagan parasites. *Ecology,* 50(2): 315-323.

Hinton, H.E. 1977. Function of shell structures of pig louse and how egg maintains a low equilibrium temperature in direct sunlight. *Journal of Insect Physiology,* 23: 785-800.

Hopkins, G.H.E. & Clay, T. 1952. *A check list of the genera & species of Mallophaga.* London, British Museum of Natural History. 362p.

Kellogg, V.L. 1906. Mallophaga from Argentina. *Journal of the New York Entomological Society,* 14(1): 45-49.

Klockenhoff, H.F. 1980. Populationsstudien an Tierläusen (Phthiraptera) II. *Myrsidea cornicis* (DeGeer, 1778) (Menoponidae: Amblycera). *Bonner Zoologische Beiträge,* 30(3-4): 410-430.

Klockenhoff, H.F. 1984a. Redescription of *Myrsidea serini* (Mallophaga: Menoponidae), a parasite from passerine birds. *New Zealand Journal of Zoology,* 11: 17-22.

Klockenhoff, H.F. 1984b. Mallophagen der Gattung *Myrsidea* Waterston, 1915 von afrikanischen Webervogeln (Ploceidae) – II. *Bonner Zoologische Beiträge,* 35(1-3): 269-284.

Klockenhoff, H.F.; Schirmers, G. & Zysk, M. 1979. Populationsstudien an Tierläusen (Phthiraptera) I. *Myrsidea obovata* (Piaget, 1880) (Menoponidae: Mallophaga) *Bonner Zoologische Beiträge,* 30(1-2): 204-216.

Koop, J.A.H. & Clayton, D.H. 2013. Evaluation of two methods for quantifying passeriform lice. *Journal of Field Ornithology,* 84: 210-215.

Montaldo, N.H. 1979. Presencia de Chloris chloris en la Argentina. *Hornero,* 12: 57-58.

Negru, S. 1963. Mallophaga new to the fauna of Rumania (Mallophaga Nitzsch). *Comunicarile Academii Republicii Populare Romine,* 13(11): 989-993. [in Romanian]

Negru, S. 1965. Contribution à la connaissance des Mallophages (Mallophaga Nitzsch) du *Serinus canaria serinus* (L.). *Travaux du Museum d' Histoire Naturelle Grigore Antipa,* 5: 495-501.

Nelson, B.C. 1972. A revision of the New World species of *Ricinus* (Mallophaga) occurring on Passeriformes (Aves). *University of California Publications in Entomology,* 68: 1-130.

Olrog, C.C. 1979. *Nueva lista de la avifauna argentina.* Tucumán. *Opera Lilloana,* 27:1-324.

Olrog, C.C. 1984. *Las aves argentinas: Una nueva guía de campo.* Buenos Aires, Administración de Parques Nacionales. 352p.

Price, R.D. & Dalgleish, R.C. 2007. *Myrsidea* Waterston (Phthiraptera: Menoponidae) from the Emberizidae (Passeriformes), with descriptions of 13 new species. *Zootaxa,* 1467: 1-18.

Price, R.D., Hellenthal, R.A. & Palma, R.L. 2003. World checklist of chewing lice with host associations and keys to families and genera. *In:* Price, R.D.; Hellenthal, R.A.; Palma, R.L.; Johnson, K.P. & Clayton, D.H. *The chewing lice: world checklist and biological overview.* Illinois. p. 1-448. (Illinois Natural History Survey Special Publication 24).

Rheinwald, G. 1968. Die Mallophagengattung *Ricinus* DeGeer, 1778. Revision der ausseramerikanischen Arten. *Mitteilungen aus dem Hamburg Zooloichen Museum Institute,* 65: 181-326.

Séguy, E. 1944. Insectes ectoparasites (Mallophages, Anoploures, Siphonaptères). *Faune de France,* 43: 23-407.

Złotorzycka, J. 1964. Mallophaga parasitizing Passeriformes and Pici I. Subfamilies Dennyinae, Machaerilaeminae, Colpocephalinae. *Acta Parasitologica Polonica,* 12(17): 165-192.

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